CLAIMS

1. A method of laser-welding a tube-yoke interface for a vehicle driveshaft, the method comprising:

providing the driveshaft including a tube having an open end and a yoke having a tube-engaging pilot;

disposing the tube-engaging pilot through the open end to engage the pilot and the tube, defining the tube-yoke interface; and

laser-welding the yoke and the tube at the tube-yoke interface forming a welding joint to define the driveshaft.

2. The method of claim 1 further comprising:

providing a laser-welding source for laser-welding the yoke and the tube, wherein the laser-welding source includes a power of at least about 2.5 kilowatts; and

rotating the tube and yoke at a travel speed ranging between about 5 - 20 revolutions per minute.

3. The method of claim 1 further comprising shielding the tube-yoke interface as the yoke and the tube are laser-welded.

4. The method of claim 3 wherein shielding includes shielding the tube-yoke interface with gaseous argon.

5. The method of claim 2 further comprising rotating the tube at least 360° when the yoke and the tube are laser-welded.

6. The method of claim 1 further comprising:

measuring runout of the driveshaft, after laser-welding the tube-yoke interface;

straightening the driveshaft, if runout is measured to be greater than 0.02 inches;

measuring imbalance of the driveshaft; and

adding weight to the driveshaft, if imbalance is measured to be greater than 0.2 inch-ounce.

7. The method of claim 2 wherein the laser-welding source emits a Nd:YAG laser having dual spot optics.

8. The method of claim 2 further comprising verifying the power and the speed at which the laser-welding source laser-welds the yoke and the tube.

9. A laser-welded driveshaft comprising:

a tube having a driveshaft wall extending to an open end, the wall having inner and outer surfaces; and

a yoke laser-welded to the open end of the tube.

10. The laser-welded driveshaft of claim 9 wherein the yoke has a body portion and a tube-engaging pilot extending from the body portion, the body portion having a head and an outer wall extending therefrom to the tube-engaging pilot, the pilot having a contact wall extending from the outer wall defining an outer shoulder to engage the open end of the tube, the contact wall being radially formed to insert through the open end and engage the inner surface of the driveshaft wall.

11. The laser-welded driveshaft of claim 9 wherein the yoke is laser-welded to the open end of the tube with a metal alloy.

12. The laser-welded driveshaft of claim 11 wherein the driveshaft comprises the metal alloy.

13. The laser-welded driveshaft of claim 12 wherein the metal alloy is aluminum alloy.

14. The laser-welded driveshaft of claim 9 wherein the driveshaft is configured to have a balance less than 0.2 in-oz balance.

15. The laser-welded driveshaft of claim 9 wherein the tube has a diameter greater than about 3 inches.

16. A laser-welded driveshaft comprising:

a tube having a driveshaft wall extending to an open end, the wall having inner and outer surfaces; and

a yoke Nd:YAG laser-welded to the open end of the tube, the yoke having a body portion and a tube-engaging pilot extending from the body portion, the body portion having a head and an outer wall extending therefrom to the tube-engaging pilot, the pilot having a contact wall extending from the outer wall defining an outer shoulder to engage the open end of the tube, the contact wall being radially formed to insert through the open end and engage the inner surface of the driveshaft wall.

17. The laser-welded driveshaft of claim 16 wherein the driveshaft comprises the metal alloy.

18. The laser-welded driveshaft of claim 17 wherein the metal alloy is aluminum alloy.

19. The laser-welded driveshaft of claim 16 wherein the driveshaft is configured to have a balance less than 0.2 in-oz balance.

20. A method of laser-welding a tube-yoke interface for an aluminum vehicle driveshaft, the method comprising:

providing the aluminum driveshaft including a tube having an open end and a yoke having a tube-engaging pilot;

disposing the tube-engaging pilot through the open end to engage the pilot and the tube, defining the tube-yoke interface; and

YAG laser-welding the yoke and the tube with a feed wire at the tube-yoke interface forming a welding joint to define the driveshaft.